Whiskeytown National Recreation Area

Proposed Removal of the A-Frame Dam Near Brandy Creek

ENVIRONMENTAL ASSESSMENT

July 8, 2002

WHISKEYTOWN UNIT – WHISKEYTOWN-SHASTA-TRINITY NATIONAL RECREATION AREA
SHASTA COUNTY, CALIFORNIA

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UNITED STATES DEPARTMENT OF INTERIOR • NATIONAL PARK SERVICE • PACIFIC WEST REGION

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Introduction

Whiskeytown is a unit of the Whiskeytown-Shasta-Trinity National Recreation Area. It is located in Shasta County, California about 8 miles (13 kilometers) west of downtown Redding (See Figures 1 & 2). Whiskeytown is a National Park Service site.

The park contains about 42,500 acres (17,000 hectares) of land and water. Elevations range from 800 feet (250 meters) in lower Clear Creek below Whiskeytown Dam to over 6,200 feet (1,900 meters) atop Shasta Bally. Vegetation in the lower elevations consists of oak woodlands and chaparral; in mid elevations mixed conifer and in higher elevations mixed conifer-old growth forest. Most of the mid elevation mixed conifer forest is second growth resulting from logging between the 1940s and early 1970s. Whiskeytown Lake, created by the earth-filled Whiskeytown Dam on Clear Creek, has a surface area of about 3,200 acres (1,300 hectares).

Whiskeytown was established by the Act of November 8, 1965 "…to provide, for the public outdoor recreation use and enjoyment of the Whiskeytown reservoir and surrounding lands…by present and future generations and the conservation of scenic, scientific, historic and other values contributing to public enjoyment of such lands and waters…"

Whiskeytown Lake provides high quality reservoir recreation opportunities because of its forested mountain setting, and its lake-like appearance. The reservoir is kept full throughout the summer months. The park has an average visitation of about 700,000 visitors per year. Visitation levels can soar in dry years when other nearby reservoirs are severely drawn down. The Bureau of Reclamation (BOR) manages the power and water supply functions of Whiskeytown Dam and Reservoir. The National Park Service manages all other facilities within the recreation area including all lands, streams, and associated forest.

The proposed project is located on Brandy Creek, approximately two miles above Whiskeytown Lake and Brandy Creek Beach at an elevation of 1,680 above sea level.

A. Purpose and Need

The National Park Service's Maintenance, Operations, and Safety of Dams (MOSD) Program is mandated by Public Law 104-303, Section 215, National Dam Safety Program Act of 1996; U.S. Department of the Interior Departmental Manual, Part 753, Dam Safety Program; and the National Park Service Management Policies, 1988 to inspect dams throughout national park sites, in coordination with the assistance of the Bureau of Reclamation (BOR). These mandates are included in National Park Service Special Directives 87-4, National Park Service –40, and related technical guidelines. The MOSD program determined that the A-Frame Dam is a "downstream significant hazard potential structure," and corrective actions must be taken.

Each Department of the Interior (DOI) agency is required to have a dam safety officer. One of the primary reasons for creating this program was to prevent another incident like the Lawn Lake Dam Failure of 1982 (Rocky Mountain National Park) when three park visitors were killed and $30 million dollars in damages occurred. Because of the BOR's expertise and oversight of the U.S. Department of the Interior's MOSD Program, the Service has regularly used their services and advice in managing National Park Service dams and monitoring non-National Park Service structures affecting the National Park System.

The dam safety program is vitally necessary because of increased activity and development around and downstream of these dams. The basic goals of the MOSD Program are either maintain or deactivate the dams. In 2000, Congress authorized $400,000 to take corrective action on the A-Frame Dam at Whiskeytown NRA.

The A-Frame Dam is an earthen embankment located approximately 2 miles upstream of Brandy Creek Beach and Whiskeytown Lake. This dam was classified by BOR as a "downstream significant hazard potential structure," with an unsatisfactory dam safety rating. This means that dam safety deficiencies exist for normal operating conditions, and that immediate corrective action is necessary. The A-Frame Dam has a moderately high rating of 416 (rating 1 to 1000) on the Department of the Interior Technical Priority Rating List; the third highest in the Pacific West Region (California, Oregon, Washington, Idaho, Hawaii).

The dam embankment has a structural height of about 30 feet, with a maximum reservoir capacity of 5 to 6 acre feet (prior to siltation the dam had a capacity of around 18 acre feet). The dam crest is approximately 100 feet long, 8 to 10 feet wide, and is at the elevation of 1,628 feet above sea level. The dam has a unlined channel spillway in the left abutment which is seriously undersized and frequently overflows, eroding the downstream groin of the dam. There is no low-level outlet works. Cracks in the dam may indicate structural instability of the embankment.

During the late 1980s and again in 1996, the dam outlet (culverts) were clogged by woody debris and vegetation during a large storm event. The pond flooded and crested the dam, causing a deep gully to be formed in the center of the dam. The face of the dam

suffered erosion and some earthen material slid in a shallow seated slide on the face of the dam. The pond partially drained as a result of the breach in the dam. Park maintenance crews at the time, rebuilt the A-Frame Dam, removed the culverts, constructed a new spillway in the left abutment of the dam, cleared the dam face of vegetation (shrubs and trees) and rebuilt the Brandy Creek trail to pass over the dam crest.

The A-Frame Dam is situated on a small intermittent creek and is approximately 200 yards upstream of its confluence with Brandy Creek. The A-Frame Dam is situated on an unnamed intermittent creek where a small valley widens slightly before the stream passes through a narrow canyon feature. Immediately downstream of the steep and narrow canyon, the stream enters Brandy Creek at an angle of 90 degrees.

According to the National Park Service engineer for dam safety, Charles Karpowicz, (MOSD Program Officer, Washington D.C.) and the Bureau of Reclamation, the concern about the A-Frame Dam is the potential for a catastrophic failure to occur. In such a scenario, a heavy winter storm would saturate the soils in the drainage, causing excessive runoff. Storm debris would cause the spillway to become plugged and the pond waters would crest the dam face. Erosion and saturation would cause the dam to fail.

Erosion at the dam could cause a rush of water and mud to surge downstream and enter Brandy Creek. If the dam structure itself eroded rapidly, mud and debris could enter Brandy Creek with enough impact to temporarily hold back the steep mountain stream waters. By either temporarily damming Brandy Creek or retarding the creek's flow, a debris flow situation could occur. As Brandy Creek temporarily backs up behind the debris and mud flow, significant pressure would cause the mud-plug to surge down Brandy Creek channel. Potentially, between 2,000-7,000 cubic yards (dam and reservoir accumulated sediments) of material could be eroded and mobilized down stream. Such a debris flow occurred at Whiskeytown in the Paige Boulder drainage in the winter of 1997 causing extensive damage to the stream channel and destroyed the road bridge at the National Environmental Education and Development Camp (N.E.E.D Camp).

The 1997 incident on Paige Boulder Creek has been estimated to have added ten times more material as it passed downstream towards Clear Creek causing much destruction and destroying a large auto bridge.

Such events have occurred throughout the West and debris flows occur naturally at Whiskeytown every few decades. A mud flow in Brandy Creek channel has the potential, based on the steep gradient of Brandy Creek and its stream bed characteristics, to send a large amount of mud, water, rock and vegetation downstream to Brandy Creek Beach. In a worst case scenario, such an event could take out the road bridge on Kennedy Memorial Drive and could damage or destroy the foot bridge in the Brandy Creek Picnic Area. Any visitors within the Brandy Creek corridor would be threatened during such an event.

Another possibility to the dam failure scenario would be a less dramatic event that would not become a debris flow, but a steady drain of the reservoir pond. Public scoping

meeting comments by the public on June 18, 2002, suggested that if the dam were to fail, it would only raise Brandy Creek flow several inches for a short duration as the reservoir drained. In such a scenario, the dam face would erode and cut downward leaving behind a gully and significant amount of sediment would have washed downstream.

The A-Frame Dam was constructed 42 years ago, prior to National Park Service ownership as part of the Westlake family's residents. When the park was established in 1965, the Westlake's A-frame residence was purchased by the Department of Interior and the cabin was torn down. At that point in time, some 37 years ago, the dam no longer served its intended purpose in supporting a private family's residential recreational activities (Jim Westlake, March 6, 2002).

B. Alternatives

B.1 Alternative A- No Action (Maintain Existing Dam and Pond)

Under this alternative the existing dam would remain in place as it has for the past 42 years. The existing dam was rated as a "downstream significant-hazard potential structure," during a "*Safety Evaluation of Existing Dams*" (SEED Program) study in September 1997 (National Park Service, Wayne N. Young, P.E). Improvements would need to be made to the structure for its continued use because the dam has no low-level outlet works and the existing dam's unlined spillway is only two feet below the crest of the dam. In addition, the BOR has given the A-Frame Dam an unsatisfactory dam safety rating.

If the dam were to be retained, the continued potential of a dam overtopping event would exist during intense storm events. Sediments moving downstream continue to build the delta areas outward into the reservoir pond. As a result, the reservoir is smaller today than it was when first constructed in the early 1960s. If the No Action alternative is chosen, the dam's reservoir will have to be excavated or the pond will eventually fill in with sediments. Sedimentation of the pond may take another 50 to 75 years to fill in completely. A large sediment event storm could accelerate the rate of the filling. While this is a possibility, it is more likely that gradual filling of the reservoir pond will continue. Normal annual maintenance would continue to preserve the dam and the structure would be monitored, especially during and after large storm events.

B.2 Alternative B- Reconstruct Existing Dam Structure

Under this alternative, the existing dam structure would be removed and reconstructed to meet the new standards and guidelines for safe dam structures. The earthen dam would have to be studied, engineered, removed, and rebuilt. Prior to any of these improvements, the following six items would have to be addressed as suggested by Chris J. Veesaert, Manager, Inspections and Emergency Management Group, BOR, (memo to Superintendent of Columbia Cascades Support Office, Pacific West Region, June 28, 1999).

1. Downstream failure inundation map outlining a warning and evacuation of people at risk during failure of the dam would have to be developed for maintaining a dam at this location.

2. Have a geotechnical engineer analyze potential dam safety deficiencies involving the embankment dam and perform necessary corrective action to the dam (e.g. the large crack on the downstream shoulder of the dam, and the eroding/oversteepening of the left downstream groin).

3. Consider an outlet works to provide reservoir evacuation capability in the event of problems at the dam, or determine the feasibility of using pumps to evacuate the reservoir.

4. Develop an Inflow Design Flood (IDF) for the A-Frame Dam. This would require using flood routing data derived from the IDF. A spillway should be designed for the dam.

5. Determine the need to conduct foundation investigations to determine the engineering properties of the foundation and embankment materials. Evaluate the static and dynamic stability of the dam.

6. Perform a survey of the dam's embankment to determine the proper engineered slope and crest of the dam. From the survey information, dam height in relation to the surface of the pond's high water level can be computed for flood conditions. This information will help engineers determine a static and dynamic stability analysis of the dam.

Following the completion of the above six actions, the National Park Service would move ahead in designing and re-building the A-Frame Dam. These dam restoration efforts would cost $400,000 or more to perform. The dam, however, is no longer needed for water storage or as a recreational facility for the residence that originally constructed the dam. If the National Park Service improves the existing structure to prevent a catastrophic event, continued cost to maintain the structure will be incurred annually by the government. Finally, routine dam safety inspections must be completed every three years in perpetuity and annual maintenance logs on the structure need to be documented, audited, and reviewed by certified engineers and inspectors.

Presently, the dam is slowly filling in with stream transported sediments and the pond will eventually disappear in 50 to 75 years time. As the pond comes close to being filled, new hazardous conditions will be created where the stream could easily breach the dam during a storm event and cause accelerated erosion and dam failure.

B.2.2 Construction Schedule, Alternative B

The following schedule outlines key steps necessary to reconstruct the dam and reservoir to meet safe dam standards:

1. Drain the Reservoir.

2. Transplant native species to Brandy Creek or Whiskeytown Lake.

3. Euthanize all exotic species on site or transfer animals for use and study in biology classes at local schools and colleges.

4. Excavate accumulated sediments in reservoir pond and large delta.

2. Remove dam structure for reconstruction following best practices to control erosion and sediments from entering Brandy Creek.

3. Redesign and rebuild dam structure installing a low-level mechanical outlet works for reservoir drainage or installation of electric pumps and monitoring equipment with alarm system.

4. Re-construct dam foundation and dam structure.

5. Revegetate disturbed areas within construction impact footprint and restoration areas , approximately 1.27 acres.

6. Allow the reservoir to refill and monitor dam structure.

7. Monitor exotic species control in and around the reservoir.

Removal of the sediments from the reservoir and the large delta upstream of the pond would also extend the existence of the reservoir. The amount of excavation and relocation of sediments would directly relate to the funds available following the engineering and design of the new dam facility built to National Park Service and BOR (BOR) dam safety specifications. It is estimated that approximately 2,300 cubic yards of accumulated sediments in the reservoir exist and some 2,335 cubic yards of sediment are stored in the delta area. The dam also has approximately 2,370 cubic yards of material. The dam's material will have to be temporarily stored on site, probably along the access road to the dam.

The soils used to rebuild the dam will have to meet engineered requirements to facilitate a safe dam structure. Additional material may have to be purchased to meet soil gradation requirements to meet filter/drainage material standards. Most notably a zone of filter material would be composed of clean sand (less silt and clay then presently exist) to accommodate drainage of the dam's seepage. This material will likely have to be imported and brought on site via dump truck hauls.

B.3 Preferred Action Alternative C- Remove the A-Frame Dam and Restore the Site to its Natural Condition/ Environmentally Preferred Alterantive

This alternative proposes to remove the dam and restore the site. The project would be completed in ten phases: 1) Clearing and grubbing; 2) Draining of the pond; 3) removal of pond fish & wildlife; 4) removal of dam prism; 5) regrading of alluvial fan; 6) restoring drainage to natural contours 7) restoration of local excavated sites with dam fill material; 8) revegetation; 9) trail re-alignment 10) monitoring for exotic plants and animals.

B.3.1 Clearing and grubbing: A temporary construction limit fence would first be installed around the project perimeter to prevent inadvertent damage to soils and vegetation outside the project. Then woody vegetation and roots within the areas to be excavated or filled within the construction limits would be removed.

Certified weed-free straw bales will be placed every ten feet below the dam in a fashion to function as a checkdam. Each checkdam will have multiple straw bales capable of retaining sediment for at least 12 inches deep. There would be at least five checkdams installed to collect any sediment directly below the dam.

B.3.2 Draining of the pond: De-watering the pond would occur in late spring or early summer after all surface-fed streams have gone dry. Gasoline powered pumps and/or a siphon would be used to de-water the reservoir behind the dam. The pump would be situated on the dam and a large hose would pump the water up and over the dam into the spillway channel. The pumped water would flow into Brandy Creek on the downstream side of the dam structure. The hose would be situated in the pond on a floating raft to prevent sediment from being sucked into the pump so turbidity contamination would not be an issue. Turbid water would not be allowed to run directly into the creek. If necessary, a sand filter could be installed to prevent algae and turbid water from exiting the de-watering system. Certified weed free straw bales would be used extensively to assist in settling turbid water from de-watering efforts.

It is expected that springs seeping into the pond would be exposed as the pond drains. Once the pond is drained to a shallow level, the pump would discharged onto the hillside below the dam so possibly turbid water would be drained onto the ground to prevent it from directly entering the stream channel. Periodic pumping of water at the bottom of the reservoir would occur as needed until the natural stream channel is restored following the dam structure's removal. According to Mr. Jim Westlake, the person who constructed the dam in the early 1960s, the pond area had no surface water springs and received no water following the winter rainy season (personal communications, March 6, 2002).

Silt fencing and certified weed free straw bales would be used extensively throughout the construction site and especially in any area where surface water is flowing. A coffer dam would be constructed either below the existing dam or utilizing the existing structure to

retain turbid water that would be regularly pumped as necessary to prevent downstream waters from being contaminated. Water from the coffer dam would be pumped onto surrounding hillsides and allowed to percolate into the ground water.

B.3.3 Removal of Fish and Wildlife: As the pond waters recede through the gas operated pump, park staff will utilize scoop nets to remove all fish and other types of wildlife from the pond. Eventually, the pond will be pumped to a level where personnel will utilize waders to enter the pond and manually collect the fish, frogs, and pond turtles. At this point, it is expected that the pond waters will become turbid from the netting activity. Pumping discharge will be re-directed to the hill slope below the dam so the water will not enter the surface flow of Brandy Creek or its tributaries. Straw bales and sand filters can be used if necessary, to ensure that only clear, clean water, passes through the de-watering system.

Preliminary field surveys of fish and wildlife were conducted in the summer of 2001 (see appendix for species list). During the survey, western pond turtles were the only animals found that are federally listed species of concern. There are no known rare or endangered species that we found during these field surveys. Two other federally listed species of concern were found living above and below the A-Frame pond; they are the foothill yellow legged frog and the tailed frog. It is believed that bullfrogs (*Rana catesbeiana*) living in the A-Frame pond are preying successful on both of these species in the vicinity of the reservoir. The youngest pond turtle inspected was 15 years old and healthy. The park biologist (*J. Gibson*) believe predation by bullfrogs and other animals is preventing young pond turtles from reaching maturity and eliminating successful reproduction of turtles and other native amphibian species.

This alternative calls for transporting all native species of fish and amphibians to either Brandy Creek or to Whiskeytown Lake. Large coolers would be used to transport the native species to Brandy Creek or Whiskeytown Lake. Certain species, such as the western pond turtles, would be placed in nearby pools in Brandy Creek.

Exotic species, particularly the Bull frog (*Rana catesbeiana*), would not be relocated within the park. Non-native species would be euthanized using dry ice in sealed plastic 5 gallon buckets or donated to educational institutions for study in biology classes.

B.3.4 Dam Structure Removal: Dam excavation (initial heavy equipment work) would commence after the pond is de-watered or as soon as the pond dries out. This should allow the site to dry out to a point that heavy equipment can safely operate within the reservoir area. One option is to keep a lower portion of the dam structure in place to serve as a small coffer dam in the low drainage area of the channel. This coffer dam would be removed once the site has been re-contoured to its natural profile and the site restored.

An excavator, a high track five-way blade bulldozer, a front-end loader and a dump truck would be used in the removal of the dam structure and to excavate the canyon to its original contour. Best management practices (BMP)will be used during the entire

operation to eliminate any potential erosion or turbid waters from entering Brandy Creek.

During construction, the section of the Brandy Creek Trail would be closed to visitors. Visitors wishing to ride their bicycles or hike the trail, would be re-routed temporarily along the Shasta Bally Road to where the Brandy Creek Trail intersects the road. This should last no more than the estimated four month constructed period.

BOR conducted a field analysis of the A-Frame Dam's soils and estimated cubic yards of sediments used in constructing the dam, and the estimated volume of material in the delta area above the pond (March 2002). The volume of material is as follows:

Dam	2,371 (cubic yards)
Reservoir	2,302 (cubic yards)
Delta	2,357 (cubic yards)
Total:	7,030 (cubic yards)

The equipment would pull material from the dam structure and push the material to either side of the reservoir. The material would be placed from where it was removed during the construction of the dam in the early 1960s. The original contractor/owner of the dam, Mr. Jim Westlake of Old Shasta, visited the site with park staff (personal communication, March 6, 2002) and recalled how the dam was made and from where the material was excavated. Graded scars on either side of the dam show some areas of excavation from where dam material was removed. There were two small spur ridges that paralleled the creek on either side that were removed and used as material for the dam. The equipment would restore these features and the soil horizons to their original contour and revegetate the landforms with native plants. The final restoration of the site would return the small stream corridor to its original contours. Bedrock is at the base of the dam, and the foundations to the two spurs adjacent to the creek that were used as sources of excavated material for creating the dam are still visible. Thirty to forty year old trees, mostly pine, have grown on the excavated areas. Some of these trees would be removed to accommodate the fill material and new trees (seedling stock from the area) would be replanted in their place.

B.3.5 Regrading the Alluvial Fan (Delta 1)

The alluvial fan, immediately upstream of the pond has filled in considerably since the dam was built in the early 1960's. The sediment deposits likely occurred during major storm events, as the material washed down stream and came to rest when reaching the base level of erosion at the dam's pond. Approximately 2,350 cubic yards of material is estimated in this delta area. The alluvial fan would be removed by pushing the material up-slope, assisting with the restoration of the two spur ridges that passed on either side of the creek. The top 4 to 5 feet of material would be scraped off until original soils were encountered. According to Mr. Westlake, he felt this would require scraping a tapered

layer back from the pond for about 30 feet. The material would be moved and used to revegetate the surrounding features that are presently scarred by the original dam construction.

B.3.6 Approach Road Fill and Roadbed Construction Some of the excavated material removed from the dam prism and from the alluvial fan on the upstream end of the pond would be placed in the road cut that once served as the drive way of the A-Frame house. The size of the road cut would be reduced and converted to the size of a trail. The steep section of the driveway that leads uphill into the forest towards the existing Brandy Creek campsites would be obliterated and restored back to natural conditions. Only the section leading in front of the A-Frame house location would remain for auto turn around. From the A-Frame house location to the dam, the road would be reduced to the width of a standard hiking trail. All excavated material would be revegetated with certified weed-free straw mulch and native grass seeds. Some native shrubs and trees would be planted in disturbed areas to encourage native plant restoration.

A second phase of revegetation would occur in the fall 2003 and the access road would be decompacted prior to planting. The silt fences and other erosion sediment control measures would be monitored and maintained throughout the first winter so as to insure that sediments do not enter the creek before a stable vegetative cover is established.

B.3.7 Exotic Plant and Animal Monitoring Monitoring will be used on site to control exotic weeds and/or non-native plants that could enter the construction site. Direct herbicide application will control exotic weed introduction and distribution within the 1.27 acres of disturbed area. While exotic animals should not utilize the restored site, the park's staff will conduct periodic exams of the riparian habitat to search for remnant bull frogs.

B 3.8 Extensions to Waterfall Trails

Mitigation for the removal of the reservoir pond would include extending the current Brandy Creek Trail to Brandy Creek Falls and extending the Boulder Creek Falls Trail to the base of Boulder Creek Falls. Currently, the Brandy Creek Trail takes visitors to the first series of cascades. The actual Brandy Creek Falls is only seen if the hiker goes to the end of the existing trail and proceeds upstream cross-country to the actual falls. The Brandy Creek waterfall is approximately ¼ mile beyond the end of the existing trail tread. Visitors who are able to negotiate the steep rocky slope and slick mud from the trail end to the falls, find the Brandy Creek Falls to have high public value and aesthetic appeal. Very few park visitors actually get the opportunity to view the Brandy Creek Falls because there is no trail to the larger falls. Most people see only the picturesque cascades that is situated below the more significant falls. Alternative C would directly link the construction of an extension of the Brandy Creek Falls Trail to the removal of the A-Frame Dam. The waterfall access is approximately 2 miles upstream from the A-Frame Dam.

A second mitigation action would be to improve visitor access to Boulder Creek Falls. Presently, the trail stops prior to the base of the falls and pool. One cannot easily walk to the falls base that allows for outstanding views and a true waterfall experience. A vista point trail, that is currently in disrepair, allows visitors a view of the falls, but is set back from the falls by about 100 yards. Alternative C would tie construction funds to extend the existing trail around the base of steep rocky slope along Boulder Creek. Passage across this bottleneck portion of the proposed trail would open access for hikers of all ages to easily gain the view at the fall's base. The difficult portion of new trail that would have to be constructed is about 25 feet in length. Beyond this point, an existing social trail to the fall's base is approximately 100 yards in length and would be easy to improve.

These two trail extensions would be substantial improvements to the recreational experience of visitors at Whiskeytown's picturesque waterfalls and mountain streams**.**

B.3.9 General: Construction and erosion control Best Management Practices (BMP) would be employed. The entire work site would be fenced with a temporary fence to prevent inadvertent impacts to the surrounding vegetation and landscape by heavy equipment. The contractor would not be allowed to build temporary stream crossings that involve placing material in the surface stream, or allow equipment, heavy or other types, in the creek until the creek is dry. At the end of the project, all construction access routes and other routes that have allowed vehicles to drive into the wetlands alongside the creek would be closed and decompacted to allow revegetation and recovery of the wetland vegetation. Equipment refueling and maintenance would occur outside the stream channel and the flood plain in the vicinity of the A-frame house location. The contractor would have spill containment and clean-up equipment on site. A National Park Service contract inspector would be on-site throughout the project duration to assure contractor compliance with resource protection measures.

B.4 Alternatives Considered but Dismissed from Further Analysis

An alternative that was initially discussed, but rejected, would have lowered the face of the dam to make a smaller pond or reservoir and thereby reducing the overall threat of a dam failure or downstream hazard. This alternative was rejected because it would require the continued monitoring of the smaller dam structure on an annual basis and would also require significant retrofitting of the dam drainage system similar to those necessary if the current dam was maintained (See Alternative B). Such an alteration of the existing dam structure would be expensive, costing in excess of $350,000. Therefore this alternative was dropped from further consideration.

Another alternative considered, but rejected, would be to find an alternative purpose for the dam and pond making the facility a useful utility for park operations. Since there are no facilities in the vicinity with the exception of the primitive campgrounds, there currently is no need for the dam as a water source. The park is moving away from using surface water sources for its potable water and with the proximity of Brandy Creek and its pools, plentiful emergency water sources are available for fire fighting. While the dam has served as a de-facto sediment trap along this particular tributary into Brandy Creek,

such facilities are not part of the park's long-term strategy for improving water quality or reducing erosion in a particular watershed. Nor are such facilities encouraged to be constructed within a national park site, rather restoration to natural conditions is the standard policy for dealing with accelerated erosion issues. Accelerated erosion does not appear to be an issue in the small drainage above the A-Frame Dam.

B.5 Environmentally Preferred Alternative

The alternative that would cause the least damage to the biology and physical environment , including the natural and cultural resources, is Alternative C, the preferred alternative. No other alternative would restore the natural landscape to its original conditions, eliminate a potential threat to downstream features and eliminate a facility from continued maintenance responsibility and repair.

C. Affected Environment

C.1 Visitor Use

Visitation occurs along the Brandy Creek trail all year and people can access the A-Frame Dam site by automobile, bicycle, hiking, and by horseback. Primary use is in the summer season when Whiskeytown NRA receives most of its visitors, approximately 700,000 people, between the months of May and September. The dam and its reservoir is a scenic feature and people can access the edge of the lake on the back side of the pond, named Delta 1 (an alluvial fan). Most people walk past the pond while hiking or bicycling, however, visitors do fish in the pond for bass and crayfish. The pond has an idyllic setting and is picturesque. Willow trees, cat tails, poison oak and other native plants surround the edge of the pond (See A-Frame Plant List). Tall conifers, mostly knobcone pine, ponderosa pine, and Douglas fir provide some shade during the hot afternoons. People can picnic on the Brandy Creek Trail that crosses the crest of the dam and on the pond's backside (alluvial fan). Some illegal campfires have been recorded near the small beach area on the south side of the pond. Brandy Creek campground with two primitive sites is situated on the bluff above the dam. Although the dam and the pond are not visible from the campsites, it is a short walk to the dam site from the campground. Brandy Creek is also within the same area and offers equal picturesque views and recreational opportunities including wading and fishing in a mountain stream with plunging pools, riffles and small cascades.

Park managers realize the pond is a picturesque location and people using the Brandy Creek Trail enjoy passing by the pond or pausing along its shore. Some visitors enjoy fishing at the pond and find it to be a lovely spot. It is one of two ponds found within the boundary of Whiskeytown NRA (the second pond is located at N.E.E.D. Camp). Most of the shoreline of the pond is covered in willows, cattails, oaks, poison oak and blackberries. People fish for bass and bullfrogs in the dam's pond (exotic to the park's fauna). Visitors to the pond in the spring and summer regularly watch bullfrogs leaping into the pond and tadpoles swimming along the shore. Fish are sometimes visible from the shoreline feeding on insects. A small (20 feet wide) gravel and sand beach provides

access to the pond's waters during the summer season, allowing people to wade or swim in the pond. Bicyclists, equestrians, and hikers do have wildlife sightings at the A-Frame Dam from birds to bears. Two Brandy Creek primitive campsites are located less than a quarter mile from the pond and provide recreational value and benefits for those camping at the sites (see map A). The A-Frame pond is a passing feature along the Brandy Creek trail and is not regarded as a destination site. In comparison to the pond at NEED Camp, where dozens of students view the pond daily, it is unusual to see other people at the A-Frame Dam during a person's visit.

Many of the dam's recreational benefits and values can also be found along Brandy Creek in a more natural setting. Access to Brandy Creek provides fishing opportunities, summer relief from the heat through wading and swimming, wildlife viewing, and reflective recreational opportunities from the stream's many picturesque spots along miles of stream banks. All of these opportunities are located just 100 yards from the existing dam and pond and could benefit not only people using the trail, but also campers using the primitive Brandy Creek Campground sites.

Both Brandy Creek Falls trail and the Boulder Creek Falls trail segments (included as part of Alternative C mitigation) are visited by hundreds of visitors every year, especially in the spring, summer and fall seasons. Visitors currently have difficulty in seeing portions of the falls or experience difficulty in climbing through the stream channels to access the base of the falls which are not accessible from the current trail paths (beyond the present terminus of the existing trails).

C.2 Public Safety

The dam and its related reservoir have been determined to be susceptible to flooding and may cause a significant downstream hazard to Kennedy Memorial Drive and the two bridges that cross Brandy Creek. In the recent past, the dam outlet spillway became blocked during a storm event in 1997-98 and the dam suffered significant damage. The dam was topped by flood waters and a gully formed in the center of the dam. The dam face experienced some soil erosion and a shallow seated slide with associated tension cracks. Tension cracks and soil erosion were also evident in the winter season of 2002. If the dam is not totally rebuilt with a new spillway and drainage mechanism that meets the National Park Service dam safety standards, the same occurrence in the 1997-98 dam breaching could re-occur with greater consequences.

Both Brandy Creek Falls and the Boulder Creek Falls (included as part of Alternative C mitigation) are difficult to access if one wants to view the base of the falls. Brandy Creek Falls, which is ¼ mile above the current trail terminus, is only accessible if one walks cross country up a steep and slippery drainage.

C.3 Operations

The dam serves no functional purpose at this time, other than providing a base for the Brandy Creek Trail to cross over. According to Mr. Westlake, the dam never was built for purposes other than recreation for his family and friends while they used the A-Frame

house as a second summer cabin. Park maintenance crews check the overflow channel of the dam to ensure it is free of debris throughout the winter season. Following large storm events maintenance will inspect the site to see if the structure has been damaged. This is a not a substantial workload for park maintenance crews. Every three years the park has both the National Park Service & BOR inspect the dam as part of the MOSD program.

Both Brandy Creek Falls and the Boulder Creek Falls (included as part of Alternative C mitigation) proposed trail extensions in Alternative C, would require annual trail maintenance with associated labor cost. Because these proposed trail extensions are short segments, it is anticipated that the cost would be minor, only a few hundred dollars by park crews.

C.4 Wildlife and Vegetation

Wildlife. The Whiskeytown Unit has abundant and diverse wildlife; visitors can view black bear, black-tailed deer, grey squirrel, wild turkey, California quail, mountain quail, mourning dove, and band-tailed pigeon. Other mammals in the park include mountain lion, ringtail cat, fisher, raccoon, gray fox, bobcat, fisher, and coyote.

The Boulder Creek Falls Trail has bald eagles nesting between the falls and Whiskeytown Lake. In Alternative C, proposed mitigation suggest constructing a trail extension at the falls. None of the proposed trail work would be done during the nesting season and U.S Fish and Wildlife would be consulted in the event this alternative is selected and bald eagles are present. The falls in relation to the nest is over 1 mile away.

The following two lists identify all known animal species and vegetation surveyed at the dam site over the past year and from historic records from the park archives.

A-Frame Dam Animal Species List

(compiled from gill-net surveys with Mark Buktenica, live-trapping with the USGS, and National Park Service Bird Surveys)

Fish

Common Name	Scientific Name	Status
large-mouth bass	*Micropterus salmoides*	Non-native
blue gill	*Lepomis macrochirus*	Non-native
green sunfish	*Lepomis cyanellus*	Non-native
mosquito fish	*Gambusia sp.*	Non-native

Herpetofauna

Common Name	Scientific Name	Status
bullfrog	*Rana catesbiana*	Non-native and invasive
western pond turtle	*Clemmys marmorata*	Federal species of concern
terrestrial garter snake	*Thamnophis elegans*	Native
western fence lizard	*Sceloporus occidentalis*	Native

Birds

Common Name	Scientific Name	Status - all native
northern flicker	*Colaptes auratus*	
Belted kingfisher	*Ceryle alcyon*	
Anna's hummingbird	*Calypte anna*	
common raven	*Corvus corax*	
mountain quail	*Oreortyx pictus*	
american robin	*Turdus migratorius*	
stellars's jay	*Cyanocitta stelleri*	
dark-eyed junco	*Junco hyemalis*	
rufus-sided towhee	*Pipilo erythrophthalmus*	
red-tailed hawk	*Buteo jamaicensis*	
lesser goldfinch	*Carduelis psaltria*	
black phoebe	*Sayornis nigricans*	
bush tit	*Psaltriparus minimus*	
bald eagle	*Haliaeetus leucocephalus*	*(Boulder Creek Mitigation site only)*

Other

Common Name	Scientific Name	Status
crayfish	*Procambarus sp.*	Non-native and invasive

C.4.1 Vegetation. The park contains about 16,000 hectares (39,000 acres) of upland habitat (mostly mixed conifer forest, oak woodland, and chaparral) The wetland habitats include a 1,300 hectare (3,200 acre) lake and less than about 80 hectares (200 acres) of stream side (wetland) vegetation along the parks many small streams.

The park has numerous species of exotic plants such as star thistle, locust, Himalayan blackberry and scotch broom. The park is concentrating exotic plant removal efforts in identified locations to eliminate as much exotic seed spread as possible.

The vegetation near the A-Frame Dam includes the common plant species listed below:

A-Frame Dam Plant Species List

(March 29, 2002; G. Ring, Whiskeytown NRA; Botanist)

Trees

Aesculus californica	buckeye
Cornus sericea	miner's dogwood
Salix exigua	sandbar willow
Salix laevigata	red willow
Salix lasiolepis	arroyo willow
Pinus attenuata	knobcone pine
Pinus ponderosa	ponderosa pine
Pinus sabiniana	grey pine
Psuedotsuga menziesii	Douglas-fir
Quercus chrysolepis	canyon live oak
Quercus douglasiana	blue oak

Shrubs

Arctostaphylos viscida	white-leaf manzanita
Ceanothus cuneatus	buckbrush
Ceanothus integerrimus	deer brush
Heteromeles arbutifolia	toyon

Ferns/Horsetails/Cattails

Equisetum arvense	common horsetail
Polystichum munitum	sword fern
Typha latifolia	broad-leaved cattail
Woodwardia fimbriata	giant chain fern

A-Frame Dam Plant Species List (continued)

Forbs/Vines

Achillea millefolium	yarrow
Artemsia douglasiana	mugwort
Barbarea vulgaris (exotic)	mustard
Calochortus tolmiei	pussy ears
Chlorogalum pomeridianum	soaproot
Cirsium vulgare (exotic)	bull thistle
Claytonia perfoliata	miner's lettuce
Cynoglossum grande	houndstongue
Daucus pulsillus	wild carrot
Dentaria californica	toothwort
Dodecatheon hendersonii	shooting stars
Elodea canadensis	common waterweed
Eschscholzia californica	California poppy
Fritillaria spp.	fritillary
Galium aparine	bedstraw
Galium spp.	bedstraw
Iris spp.	iris
Juncus spp.	rushes
Lonicera spp.	honeysuckle
Lotus corniculatus (exotic)	bird's foot trefoil

Lotus oblogifolius var. oblogifolius	streamside trefoil
Mentha pulegium (exotic)	pennyroyal
Monardella villosa	coyote mint
Pedicularis densiflora	Indian warrior
Phacelia spp.	phacelia

A-Frame Dam Plant Species List (continued)

Plantago lanceolata	narrow-leaved plantain
Ranunculus spp.	buttercups
Rubus leucodermis	raspberry
Sedum spathulifolium	pacific stonecrop
Silene californica	California Indian pinks
Viola lobata	yellow violet
Vicia spp.	vetch
Vitis californica	California grape
Unknown moss spp.	
Unknown lichen spp.	

Grasses

Bromus carinatus	California brome
Elymus glaucus	blue wild rye
Carex spp.	rushes
Festuca idahoensis	Idaho fescue
Juncus spp.	sedges

C.5 Threatened and Endangered Species

The Endangered Species Act requires in part, that the federal government identify, protect, and institute programs to promote the recovery of threatened and endangered species. An endangered species is one in danger of extinction throughout all or a significant portion of it range. A threatened species is one likely to become endangered within the foreseeable future.

C.5.1 Salmonids. Since Brandy Creek is located above Whiskeytown Dam, no anadramous fish have been able to access Brandy Creek since Whiskeytown dam was completed in 1963. None of the species found in Whiskeytown Lake or Brandy Creek are considered threatened, endangered, or sensitive species. Kokanee, a land locked salmon, King salmon, rainbow trout, and brook trout live and breed in Whiskeytown Lake. These species are regularly introduced and stocked by the California Fish and Game into Whiskeytown Lake. Kokanee are frequently seen spawning in the late fall and early winter in lower Brandy Creek. Some Kokanee, in certain years based on stream flow, migrate upstream approximately ½ mile distance. This is a substantial distance from the proposed project area and thus the salmon species in the lake would not be affected.

Salmonid species need clean water and gravel for their spawning. Female fish dig a depression in the gravel stream bed and deposit eggs in this depression. If the gravel is contaminated from the silts from upstream erosion, salmon and trout species habitat and reproduction will be negatively impact.

C. 5.2 Wildlife. The park has two resident federally threatened wildlife species, the northern bald eagle and the northern spotted owl. The bald eagle and the northern spotted owl both have successful fledging records in the Whiskeytown.

Whiskeytown NRA has had two nesting pairs of bald eagles. Bald eagles are regularly observed near Whiskeytown Lake and are seen fishing along the mouth of Brandy Creek. One pair typically has nested in the lower Clear Creek watershed, about two miles from the project site, however no nesting has occurred there since 1998. The other pair nest in the Boulder Creek drainage. In the event that bald eagles nest within the project area the park would immediately contact the U.S. Fish and Wildlife Service for advice on how to proceed.

No suitable spotted owl habitat exists within several miles of the A-Frame Dam and no spotted owl activity centers have been located in the Brandy Creek watershed.

Additionally, Whiskeytown is potential habitat for the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) although there are no documented sightings. Elderberry (*Sambucus mexicana*) are a necessary habitat component for the beetle. Elderberry shrubs are only found along Upper Clear Creek on Trinity Mountain Road, several miles from the proposed project site. A recent survey within the project site found no elderberry shrubs present.

C.5.3 Other Sensitive Species

Plants. None of the 16 known plant species of special concern (threatened, endangered, candidate, or sensitive species) found in Whiskeytown NRA are believed to occur in the area of the A-Frame Dam (Gretchen Ring, National Park Service botanist, personal communications, March 2002). Two botanical surveys have been conducted in the project area during 2001-2002.

Wildlife Species of Concern (official federal designation by US Fish and Wildlife Service) found in the Brandy Creek drainage include foothill yellow-legged frog, northwestern pond turtle, and the tailed frog. The only Species of Concern that is known to exist in the pond are the western pond turtles. There may be between 5 to 10 turtles currently living in the pond.

C.6. Wetlands/Stream Geomorphology

Originally, a small intermittent stream flowed through the area that is now the dam and its associated reservoir. The dam and reservoir pond prevent this naturally occurring stream from moving sediments downstream to Brandy Creek. Virtually all sediments being transported down this unnamed stream are captured in the pond's impoundment and are expanding outward into the pond from delta 1's area.

Current conditions have eliminated approximately 610 lineal feet of intermittent creek habitat as a tributary to Brandy Creek. This equates to approximately 7,300 square feet of intermittent stream riparian habitat that was lost when the dam, pond, and delta 1 area were created. An additional 220 feet or approximately 2,640 square feet of intermittent stream riparian habitat may exist below delta area 2.

In its natural state, this stream had a steeper gradient then presently exist and was free flowing. It also was a wildlife route to and from Brandy Creek. Presently the dam may prevent aquatic species from moving unrestricted up and down the stream corridor. This is especially evident where the present dam spillway channel sends the flow down a steep embankment that is equivalent to a small waterfall; about 20 feet high.

Boulder Creek and Brandy Creek are two pristine streams on the south side of Whiskeytown Lake that have spectacular waterfalls. In Alternative C, proposed mitigation for the removal of the A-Frame Dam suggest extending both hiking trails to the bases of the main waterfalls found in Boulder and Brandy Creeks. The section of trail at Boulder Creek Falls could provide access to the falls base. This, however, would require approximately 30 feet of trail, approximately 2 feet wide, to be built on the edge of the right bank of the channel. Such an extension of trail, using a rock rip rap structure along the stream bank may influence water flow during high water storm events in diverting stream flow to the creek's opposite bank. In as much as the bank is deeply incised in bedrock and the channel is composed of large granite boulders, such a minor restriction of the channel would be considered insignificant. The channel in this location is about 20 feet wide with exposed bedrock on both banks. There is considerable amount of large woody debris in this channel location.

The Brandy Creek Trail extension could be built through the forest section out of the stream channel and would not effect stream flow in any manner.

C.7 Cultural Resources

The A-Frame Dam area has been inspected for historic and prehistoric archeological resources for compliance purposes. The immediate proposed project area was inspected by professional consultants, Coyote and Fox Enterprises on February 5, 2002. National Park Service archeologists (Ann King Smith and Nelson Siefkin) also visited the site in April 2001 and did not locate archeological resources within the A-Frame Dam project area.

The survey verified that cultural resources would not likely be impacted by the proposed project or any of the alternatives proposed within this environmental assessment. If cultural resources are found, both the National Park Service Archeologists and the State Historic Preservation Office will be consulted to determine appropriate treatments before proceeding with the project. During the June 18, 2002 public scoping meeting, public comments included the viewpoint that the A-Frame Dam is part of Whiskeytown's history and traditional use. Because the dam has been around for such a long time (1960) some visitors feel that the A-Frame pond is an integral part of the park experience. The pond is tranquil and peaceful and has high aesthetic value.

D. Environmental Consequences; Direct, Indirect, and Cumulative Effects

Methodology. Potential impacts were analyzed for their context, intensity, and duration. The definitions of impact terms used in this section are:

Negligible: The impact is at the lower levels of detection.

Minor: The impact is slight, but detectable.

Moderate: The impact is readily apparent.

Major: The impact is severely adverse or exceptionally beneficial.

Non-impairment. No action is allowed to "impair" national park resources or values, according to the National Park Service Organic Act of 1916 and National Park Service Director's Order #55. An action could have some impact, even a measurable or significant impact, but "impairment" is strictly prohibited. This project, under either alternative, would have temporary, small scale, site specific impacts (e.g., dust, safety) but would not impair national park resources or values on a long-term or large scale.

D.1 No Action Alternative A

Under this alternative the National Park Service would not remove or rebuild the dam. Minimal maintenance activities related to the dam would continue. Monitoring the dam's

integrity would be done annually and the dam would continue to receive an intensive on-site inspection every three years by the National Park Service and BOR.

D.1.1 Visitor Use

Visitors would continue to periodically use the pond as a recreational site for fishing, wading, and enjoying the pond environment until the pond fills in with sediments. Visitors hiking along the Brandy Creek Trail would continue to have the opportunity to view the pond in its current setting and periodically see wildlife using the pond. Implementation of the no action alternative would result in the continued threat of a downstream hazard that has a potential to cause harm and injury in the event of a dam failure. If the existing dam were to fail, the current Brandy Creek Trail would be impassable until a new route was constructed. In such a scenario, substantial work would have to be done to the dam to make it safe or remove the entire structure and drain the pond/reservoir. Visitors would not have their experience impaired if this alternative was chosen.

D.1.2 Public Safety

During high-water storm events, breaching of the dam face could potentially cause a significant downstream hazardous event. The dam could fail in a dramatic event or it may leak and slowly erode creating less of an immediate hazard. Regardless, this alternative would not reduce the current visitor and resource risk that presently exist. Maintenance inspections would have to continue and repair work would be completed as is currently occurring as needed. Public safety risk would be moderate if this alternative is chosen.

D.1.3 Threatened and Endangered Species

During high-water storm events, breaching of the dam face could potentially cause a significant downstream hazardous event. Such a sediment event resulting from a catastrophic failure of the dam structure would diminish quality of fish spawning habitat downstream of the dam through Brandy Creek (Trout species and some land-locked salmon species such as Kokanee). Upwards of 7,000 cubic yards of soil (clay, silt, and gravel) could be released into the creek with a catastrophic washout event. While no threatened or endangered species are anticipated to be impacted by this alternative, sensitive species such as the northwestern pond turtle, the yellow-legged frog and pacific giant salamanders could be impacted downstream of the dam to Whiskeytown Lake if the dam failed or exotic species continued to prey on native populations.

D.1.4 Wildlife and Vegetation

D. 1.4a Wildlife. Future flooding would continue to erode sediments into the downstream habitats of Brandy Creek. This would occur either in a slow, long-term, incremental rate or in a sudden catastrophic event. Either scenario would create a loss of habitat. It is estimated by the BOR that some 7,000 cubic yards of material makes up the dam, the reservoir sediments in storage, and the delta area above the dam. Material washed out from the existing dam, pond, and delta area during a flood event would be

deposited either in the Brandy Creek stream corridor or settle out in the Brandy Creek beach area. The existing dam and pond are subject to future flooding and erosion resulting in temporary, short-term habitat disturbance and unstable animal populations in the down stream impacted area. This would be considered a moderate impact to park resources.

The park's wildlife and vegetation would not be impaired by the implementation of this alternative.

D 1.4b Vegetation. The No Action alternative would result in the continued accumulation of sediments in the delta and the pond reservoir. Eventually the dam's reservoir will be filled in with sediments. Local plant communities would continue to reflect the man-made wetlands until the pond completely fills in with sediments. The existing dam and reservoir are subject to future flooding and erosional events. Plant communities will remain unstable and adjust as the pond fills in or the park takes action to dredge the pond from time to time. In the event of a catastrophic failure of the dam, damage would occur to the riparian vegetation downstream of the dam and along the Brandy Creek corridor along the distance that the sediment debris would travel. No impairment of park resources would be expected if this alternative is chosen.

D.1.5 Wetlands/Stream Geomorphology

This Alternative would result in the continued degradation and elimination of 610 feet of intermittent stream habitat or 7,300 square feet of riparian habitat that existed on site prior to the dams construction in 1960. Approximately, 22,000 square feet or .5 acre of artificial wetlands would continue to exist in the A-Frame pond area with the re-construction of the A-Frame Dam. This includes 575 lineal feet of wetlands shoreline or 3,450 square feet of wetlands area would be maintained. The park has a net loss of 3,850 square feet of riparian stream habitat by continuing to maintain the dam. This is considered a moderate impact. Wetlands throughout the park would not be impaired if this alternative was chosen.

D.1.6 Cultural Resources

The No-Action alternative would not impact any cultural resources. The park's cultural resources would not be impaired by this project. The current dam structure and the pond is just over 40 years in age and does not qualify as a historic structure. An archeological survey completed February 5, 2002, confirmed an earlier National Park Service assessment that no archeological resources are known to exist in this area and thus no impairment of park cultural resources is expected.

D.1.7 Operations

Future wintertime dam breachings are anticipated. During these flood events there would be no trail access to the west side of the dam, the pond would quickly lower depending on how deep the gully on the face of the dam erodes downward. Park maintenance operations and emergency services would monitor the situation in the event of a

breaching. During such an event, the Brandy Creek area would be closed to the public for safety concerns. During the summer season, the concern for a major flood event would be significantly less, unless an isolated thundershower precipitated a significant amount of rain in the Brandy Creek drainage. This would be a moderate impact to the park operations.

Annual maintenance cost are relatively low and expected not to cost the park more than $1,000 a year in labor cost for personnel to inspect the facilities and do minor cleaning of the spillway. If and when storm damage requires repair, cost rise significantly for personnel labor, rental of heavy equipment and any supplies. If a large storm did damage throughout the park as occurred during the winter of 2001, regional funds would likely be used to make repairs. No impairment of park resources would be expected if this alternative is chosen.

D.1.8 Cumulative Impacts

With the retention of the A-Frame Dam and its propensity to breach and deposit sediments downstream, implementation of this alternative would work against efforts to restore watersheds within Whiskeytown NRA. These improvements include the removal of culverts, the continued outsloping of gravel roads throughout the park, and converting abandoned logging and mining roads back to their original natural contours. The goal of these projects is to restore the natural drainages, reduce erosion, and restore natural habitat. This alternative would tend to counter the positive cumulative impacts of the watershed restoration efforts throughout the park. No impairment of park resources would be expected if this alternative is chosen.

D.2 Alternative B, Reconstruct Existing Dam Structure

Under this alternative, the existing dam structure would be reconstructed to meet the new standards and guidelines for safe dam structures. The earthen dam would have to be studied, engineered, removed, and rebuilt. Prior to any of these improvements, the six items would have to be addressed, as suggested by Chris J. Veesaert, Manager, Inspections and Emergency Management Group, BOR, (memo to Superintendent of Columbia Cascades Support Office, Pacific West Region, June 28, 1999); See page 5, B.2, for complete list.

D.2.1 Visitor Use

Alternative B would temporarily disrupt the visitors using the Brandy Creek Trail and the pond's recreational resources during the reconstruction of the dam. However, this would be a relatively short-term impact lasting no more than a year's time. The long-term benefit would be continued recreation in this small pond setting that includes fishing, wading, and wildlife viewing. The disruption period of reconstructing the dam to meet National Park Service dam safety standards is similar to Alternative C, in removing the dam structure completely. The idea behind replacing the existing structure with a new dam structure built to National Park Service and BOR standards would be to prevent the

dam from failing during a large storm event. This alternative, if implemented, would be the safest method of retaining the pond environment and its associated recreational activities and at the same time reduce the threat of a catastrophic failure of the dam.

Upon completion of the new dam, the pond would have mechanical equipment used to monitor water level, provide an outlet works to drain the dam below with either electric pumps or manual valve. Power pole and electric lines would have to be installed to the A-Frame Dam if electric pumps are utilized. These features would be new and would intrude on the natural setting that presently exist in the drainage. Mitigation could be done to reduce the visual impact of these mechanical pieces of equipment at the pond and dam. Regardless, the dam and reservoir following reconstruction would look different then the primitive setting of today. These modifications, if implemented, would be considered moderate impacts. No impairment to visitor use would be anticipated if this alternative is chosen.

D.2.2 Public Safety

This alternative would either eliminate or greatly reduce the current hazard or threat condition that the dam currently has on downstream features, facilities and park resources. The dam structure would be reclassified on the Maintenance, Operations, and Safety of Dams program (MOSD). No impairment of visitor safety would be anticipated if this alternative is chosen.

D.2.3 Threatened and Endangered Species

There are no Threatened and Endangered Species known to exist in the proposed project area. There would be no affect or impairment on federally listed species or designated critical habitat from the proposed project activities other then those mentioned above.

D.2.4 Wildlife and Vegetation

D.2.4a Wildlife. Approximatley 1.27 acres of habitat would be disturbed in the re-construction of the A-Frame Dam. The pond would have to be drained and wildlife living within the reservoir would either be removed or naturally disperse. Native species would be relocated, and exotic species (bullfrogs & tadpoles) would be removed and euthenized on site using sealed 5 gallon buckets and dry ice or donated to educational facilities for use in their biology classes. Wildlife associated with the pond habitat, would be displaced during construction. Some of these animals could utilize adjacent undisturbed areas such as Brandy Creek. Every effort will be made to save all native animals removed from the pond. Monitoring by the park staff will make every effort to control exotic re-colonization. Most animals using the pond for a source of water would likely be able to adapt and use Brandy Creek since it is in very close proximity to the present dam and pond.

The federally listed valley elderberry longhorn beetle, gray vireo, and willow flycatcher are not currently found in the project area. These species prefer wetland habitat. Increasing the amount of riparian habitat may increase the likelihood that these species

would occupy this habitat in the future. No impairment of park resources would be anticipated if this alternative is chosen.

D2.4b. Vegetation. To reduce introduction of new exotic species or the spread of exotic species already found within the park all equipment used during construction would be washed prior to entering the park. Exotic plant re-colonization will be monitored and herbicide application will be used on site to control exotic weeds and/or non-native plants that could enter the construction site.

Implementation of this alternative would result in an expected positive impact to the park's wildlife and vegetation and park resources would be minimally impacted but not impaired. This assumption is based on the complete removal of exotic species living in the reservoir's pond. No impairment of park resources would be anticipated if this alternative is chosen.

D.2.5 Wetlands/Stream Geomorphology

This Alternative would maintain the pond and wetland habitat that was created when the dam was built. It would prevent t the 610 feet of intermittent stream habitat or 7,300 square feet of riparian habitat that existed on site prior to the dams construction in 1960 from being restored. Approximately, 22,000 square feet or .5 acre of artificial wetlands would continue to exist in the A-Frame pond area with the re-construction of the A-Frame Dam. This includes 575 lineal feet of wetland shoreline or 3,450 feet of wetland area would be maintained. By continuing to maintain the A-Frame Dam, the park has a net loss of 3,850 square feet of intermittent stream habitat or natural riparian vegetation. This is considered a moderate impact.

When the reservoir is drained, sediments that have filled in the delta area and the pond would be excavated and removed to the disturbed areas from the original dam construction. The access road below the dam and an abandoned developer's road upstream of the pond would be covered with fill and the area restored to its original contours. A trail through this area would be maintained. This alternative would generate some 7,000 cubic yards of sediment that could be relocated to benefit the park's watershed restoration efforts within the A-Frame Dam drainage. These restoration efforts would primarily benefit the restoration of mixed conifer habitat. No impairment of park resources would be anticipated if this alternative is chosen.

D.2.6 Cultural Resources

An archeological survey, completed February 5, 2002, confirmed an earlier National Park Service assessment that no cultural resources are present in the proposed project site and that no impacts are expected to occur (negative finding). All Section 106 actions shall be completed before a "Finding of no Significant Impact" (FONSI) statement is signed.

The park's cultural resources would not be impaired by this project.

D.2.7 Operations

The reconstruction of the A-Frame Dam would reduce the threat of having a sudden catastrophic failure of the dam structure. New monitoring equipment, a newly installed low level outlet and/or electric pump equipment to reduce the threat of a breaching of the dam would improve the overall safety and maintenance of the dam and its associated reservoir.

Retention of the dam and reservoir would require maintenance on the structure for perpetuity. The dam and reservoir would have to be inspected every three years and the National Park Service would be required to protect the structure from. Maintenance workers would be required to maintain a written log of the maintenance activities on the dam and its monitoring program. If electrical machinery is installed in the dam's operations, additional cost for electrical billing would be placed on Whiskeytown NRA over what currently exist today.

This is considered to be minor impact, however, the increased cost of a new dam facility would take funds away from other park priorities in both the maintenance and ranger divisions. It is estimated by BOR that this alternative would cost approximately $350,000 to complete. Park operations would not be impaired by this alternative.

D.2.8 Cumulative Impacts

Exotic species have successfully used this man-made wetland as a breeding ground for bullfrogs and some fish species. The aggressive bullfrog is well known as a predator of native amphibians found both above and below the A-Frame Dam. Coincidentally, the yellow legged frog, pacific giant salamander and young western pond turtles are not found in the A-Frame pond (*Personal communication, Jennifer Gibson, National Park Service Ecologist, March 2002).* Reconstructing the dam would require continuous monitoring for exotics, however, this alternative suggest eliminating all exotics during dam reconstruction. It is believed that such action would be beneficial to the mission and goals of the park's resources management plan. The threat of re-colonization or intentional re-introduction by a visitor of an exotic fish or amphibian would require continual monitoring over the life of the reservoir. No impairment of park resources or visitor experience would be anticipated if this alternative is chosen.

D. 3 Alternative C, (Preferred Alternative); Remove the A-Frame Dam and Restore the Site to its Natural Condition.

This alternative would analyze the complete removal of the A-Frame Dam structure, the reservoir deposited sediments, and the delta's accumulated sediments. The site would be restored to its original natural contours based on topographic analysis and on personal communications from Mr. Jim Westlake, the original owner/contractor who constructed the dam and was the last person who saw the small drainage prior to dam construction in 1960. The removal of the dam and complete restoration of the site would also eliminate the need for continued maintenance of the dam, annual maintenance reporting, and eliminate the inspection by BOR and the National Park Service dam safety officials. The removal of the dam would reduce the cost of operations and these funds and staff commitment could be directed to maintenance of recreational trails throughout the park and park operations. No impairment of park resources would be anticipated if this alternative is chosen.

D.3.1 Visitor Use

Disruption of visitor use along the Brandy Creek Trail would occur between June and mid-October during the removal of the dam and accumulated sediments in the reservoir and delta areas. During this time, visitors would be directed to hike from the Brandy Creek Campground along the Shasta Bally Road to the next intersection with the Brandy Creek Trail, a distance of approximately ½ mile. Construction and revegetation work would take approximately 3-5 months.

When construction work is completed, the trail would continue to be routed through the A-Frame Dam site as it was in the past, although the trail would be re-routed around the back side of the old reservoir's pond. During construction mountain bikers, equestrians, and hikers would still have access up the Brandy Creek corridor from Brandy Creek Beach to the Brandy Creek waterfall, with the detour section around the work site. Since the A-Frame Dam is situated in the middle portion of the Brandy Creek trail, it is believed that this 3-5 month reroute, with an easy accessible alternate detour, makes this temporary change a minor impact to visitors. Because heavy equipment will be pushing close to 7,000 yards of earth to restore the site, it is appropriate from a visitor safety and aesthetic purpose to re-route public use around and away from the construction area.

Visitors at Brandy Creek and Boulder Creek Falls would not be displaced from current opportunities if proposed mitigation for trail extensions are completed. Since all work would extend the trail beyond existing trail lengths, visitors would not be restricted from using trail as they do now. If proposed alternative C is selected and work completed at both trails as suggested mitigation, visitors would be able to extend their hiking opportunities to the remote waterfall vista points. No impairment of park resources would be anticipated if this alternative is chosen.

D.3.2 Public Safety

This alternative would eliminate the current hazard that the dam currently has on downstream features, facilities and park resources. The dam would be de-classified and removed from the Maintenance, Operations, and Safety of Dams program (MOSD) if this alternative is implemented. The site, once restored would no longer threaten any visitors or resources downstream from the current dam location based on a dam failure. All visitor use would be diverted around the construction site through detours to eliminate any endangerment of visitors while heavy equipment is operating during the dam removal and site restoration.

Currently, visitors trying to reach the base of Boulder Creek Falls and Brandy Creek Falls take moderate risk in climbing over slippery rock and wet boulders in the stream channels to view the waterfall's base pools. While no one has been injured recently attempting to reach these vistas, it is recognized that elderly people and children could be seriously injured in a fall during such an attempt. Improving the tread of the trail to these vista points would increase the park experience and make the vistas of the falls available to more people then presently able. No impairment to public safety would be anticipated if this alternative is chosen.

D 3.3 Threatened and Endangered Species

D 3.3a Wildlife. The park has two resident federally threatened wildlife species, the northern bald eagle and the northern spotted owl. The bald eagle and the northern spotted owl both have successful fledging records at Whiskeytown.

Whiskeytown NRA has had two nesting pairs of bald eagles. Bald eagles are regularly observed near Whiskeytown Lake and are seen fishing along the lake shore near Brandy Creek. One pair typically has nested in the lower Clear Creek watershed, about three miles from the project site, however, no nesting has occurred there since 1998. The other pair nest within about two miles of the project site. In the unlikely event that bald eagles nest within the project area the park would immediately contact the U.S. Fish and Wildlife Service for advice on how to proceed.

No suitable spotted owl habitat exists within several miles of the A-Frame Dam and no spotted owl activity centers have been located in the Brandy Creek watershed.

Additionally, Whiskeytown is potential habitat for the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) although there are no documented sightings. Elderberry (*Sambucus mexicana*) are a necessary habitat component for the beetle. Elderberry shrubs are only found in the upper reaches of Clear Creek along Trinity Mountain Road, not in the Brandy Creek Drainage. A recent survey within the project site found no elderberry shrubs present.

Bald Eagles do nest in the Boulder Creek drainage and are monitored by the park's resources management division. In the event that this Alternative is selected, trail work done in the Boulder Creek Falls area would only be done outside of the nesting season

and in consultation with the U.S. Fish and Wildlife Service. The Boulder Creek Falls proposed trail work site is over one mile distance from the known bald eagle nest site and would likely not have any influence on nest site behavior. No impairment of park resources would be anticipated if this alternative is chosen.

D 3.3b Vegetation. None of the 16 known plant species of special concern (threatened, endangered, candidate, or sensitive species) found in Whiskeytown NRA are believed to occur in the area of the A-Frame Dam (Gretchen Ring, National Park Service botanist, personal communications, March 2002). A botanical survey was conducted in the project area in the Spring of 2002 and visits to the dam site through the Summer and Winter of 2001 by the park botanist occurred as well. Park vegetation would not be impaired by this alternative.

D 3.4 Wildlife & Vegetation Habitat Restoration.

Implementation of this alternative would restore 7,300 square feet or 610 linear feet of intermittent stream and riparian/vegetation and associated wildlife habitat along the restored stream channel that historically existed in the A-Frame site. Some 22,000 square feet or .5 acres of man-made pond habitat would be eliminated. With the removal of the pond, the current exotic animal population would be eliminated. The intermittent stream channel would not be favorable habitat for the bullfrog, nor would it support any of the four exotic fish species that now inhabit the pond. While the pond's perimeter wetlands habitat would be eliminated, the creation of the 7,300 square feet of riparian stream vegetation along the intermittent channel should off set the loss. An additional 220 feet or 2,640 square feet of intermittent stream may also be developed in the second delta area, however, it is not known at this time if such habitat can be re-created when the pond is drained.

Sediments moving down through the watershed during storm events would be allowed to pass through the A-Frame Dam site without being impounded behind the dam structure. The excavation of the delta area's fill material of accumulated sediments would be used to restore upland hillside habitat that may likely benefit mammals, birds, and insect populations.

To reduce the introduction of new exotic species or the spread of exotic species already found within the park, all equipment used during the construction would be washed prior to entering the park. Exotic plant infestation will be monitored and herbicide application will be used on site control exotic weeds and/or non-native plants that could enter the construction site. No impairment of park resources would be anticipated if this alternative is chosen.

D.3.5 Wetlands/Stream Geomorphology

Implementation of this alternative would restore 7,300 square feet or 610 linear feet of intermittent stream and riparian/vegetation and associated wildlife habitat along the restored stream channel that historically existed in the A-Frame site. Some 22,000 square feet or .5 acres of man-made pond habitat would be eliminated. While the pond's

perimeter riparian habitat would be eliminated, the creation of the 7,300 square feet of riparian stream vegetation along the intermittent channel should off set the loss. An additional 220 feet or 2,640 square feet of intermittent stream may also be developed from the delta 2 area, however, it is not known at this time if such habitat can be re-created when the pond is drained.

Sediments moving down through the watershed during storm events would be allowed to pass through the A-Frame Dam site without being impounded behind the dam structure. The excavation of the delta area's 2, 371 cubic yards of accumulated sediments would be used to restore upland hillside habitat, which may likely benefit mammals, birds, and insect populations. Specifically, this material would be used to re-build the road cuts and gullies that presently send approximately 56 cubic yards of material downstream annually. The material would be re-positioned to restore hillsides that were cut to construct roadways. The dam's removal would mean the site no longer would serve as a sediment basin on this intermittent stream. No impairment of park resources would be anticipated if this alternative is chosen.

D. 3.6 Cultural Resources

An archeological survey, completed February 5, 2002, by Coyote & Fox Archeological Consultants, determined negative findings at the site. This assessment confirmed that no archeological resources should be encountered during construction. It is the intent of the National Park Service to have an archeological monitor on site during the ground disturbing activities of this proposed project. In the event that an archeological resources are encountered during excavation, all work will stop and National Park Service Regional Archeologist or contract private archeologist, will be called in and will analyze the historic/prehistoric finds.

The removal of the dam and pond would remove a park experience that some consider a traditional use of the Whiskeytown park since the dam has been in existence as a feature of the park since 1960.

All Section 106 actions shall be completed before a "Finding of No Significant impact (FONSI) statement is signed. No known cultural resources would be impaired by the selection of this alternative.

D. 3.7 Operations

Removal of the A-Frame Dam would allow fewer maintenance staff hours over the coming years and would eliminate annual inspections and maintenance work as has been required following large storm events. This would also eliminate the threat of a sudden dam failure event from occurring in the future.

Access around the dam during construction would occur for approximately a 4 to 6 month period. A shorter period of time for requiring the detour may be developed as construction details are better defined. Once the heavy equipment has left the site and the new trail is constructed around the old reservoir's back side, the project site could be

opened to the public. Revegetation of the disturbed sites will include seeding and mulching to ensure stability to the relocated material moved from the dam, reservoir, and delta areas. Public access will be opened prior to the revegetation of disturbed sites is completed, but not until all erosion control measures have been completed at the end of project completion.

If Alternative C mitigation trail extension are completed as proposed, park trail crews would be required to add these segments of trail to their annual work plan. Because of their short distances, this would not be a significant work load on park labor and would not increase operational budget expenses more then a few hundred dollars at most for annual maintenance activities. No impairment of park operations would be anticipated if this alternative is chosen.

D 3.8 Cumulative Impacts

No negative cumulative impacts have been identified in this project. It is believed, however, that removal of the A-Frame Dam and continued restoration of watersheds throughout Whiskeytown NRA would have a positive cumulative impact. Furthermore, the mitigation proposed in this environmental assessment through extending existing trails so visitors can safely view substantial waterfalls in the park will be a positive contribution to visitor recreation experience at Whiskeytown NRA. No impairment of park resources would be anticipated if this alternative is chosen.

E. Summary:

The following tables summarize the impacts to habitats in the project area.

Table 3. Summary of Impacts

Affected Environment	Alternative A	Alternative B	Alternative C
Visitor Use	Continue to use pond as in the past. No impacts to visitors.	Continue to use pond as in the past. No impacts to visitors. Temporal disruption of pond recreation during re-construction period-3 to 6 months. Exotic frogs and fish would be removed	Eliminate pond's recreational opportunities-create a more natural experience for the site as it was prior to 1960. Brandy Creek trail will be re-routed during construction.
Public Safety	Continue potential hazard-unacceptable public safety issue.	Improved public safety situation-required continued monitoring and maintenance program	Eliminate Issue of Significant Downstream Hazard
Operations	Continue Significant Downstream Hazardous Condition/ Possible Dam Failure	Reduce hazard by reconstruct-ing the dam. Estimated cost $400k	Eliminate Significant Down stream Hazard by removing the dam structure
Wildlife	Continue to have pond serve as habitat for exotic animals. Require continuous monitoring and control measures	Continue to have pond serve as habitat for exotic animals. Require continuous monitoring and control measures	Eliminate artificial habitat, eliminate exotic animals from unnatural setting. Restore native habitat.
Vegetation	Wetland vegetation would continue to grow around the reservoir's edge. These plants would serve as habitat for aquatic life. No net loss of existing plant community. Surrounding mixed conifer/ Oak woodland Habitat would continue to be impaired from existence of pond.	Reconstructing the dam to National Park Service standards would allow for the dam to remain and vegetation habitat conditions to stabilize over time. Surrounding mixed conifer/ Oak woodland Habitat would continue to be impaired from existence of pond.	Existing wetland habitat would be destroyed, but riparian habitat would be increased in restoration along 610 feet of restored stream habitat. An additional 220 feet may be possible from second delta area to the main creek channel. Mixed conifer forest and oak woodland habitat would increase with removal of pond.
Threatened & Endangered Species	Alternative A has no impacts since no T&E species are known to exist.	Alternative B has no impacts since no T&E species are known to exist in project area.	Alternative B has no impacts since no T&E species are known to exist in project area.
Cultural Resources	Archeological site investigation had negative findings-no resources known to exist	Archeological site investigation had negative findings-no resources known to exist	Archeological site investigation had negative findings-no resources known to exist
Wetlands/ Stream Geomorphology	Natural stream channel would continue to be impaired by pond and delta area advances.	Natural stream channel would continue to be impaired by pond and delta area advances	Original stream channel would be restored with the removal of delta and pond. A net gain of 7,300 square feet of riparian habitat. Alternative C mitigation may divert stream flow in Boulder Creek channel for short distance of 30 to 50 feet during high water flow. Because of bedrock channel conditions and large boulders, this is regarded as a negligible impact. Brandy Creek trail extension would be through mixed conifer forest outside of riparian area.

Table 4. Summary of Mitigation

Affected Environment	Alternative A No Action Alter.	Alternative B Reconstruct the Dam	Alternative C Remove the Dam
Visitor Use	No mitigation necessary	Recreational opportunities would be interrupted as construction of the dam is completed. The Brandy Creek trail would be re-routed or detoured around the work site. Pond recreation would continue after dam is re-built.	Pond recreation activities would cease. Construction funds would be used to extend two waterfall trails; Brandy Creek Falls Trail and Boulder Creek Falls Trail. Visitor mitigation would allow visitors to enjoy waterfalls that are currently difficult to view.
Public Safety	A downstream significant hazard would continue to exist as long as the existing dam and spillway structure is in place. Mitigation of this threat would be to increase monitoring of the dam, especially instituting a pre-winter inspection and inspections of the dam during and after storm events.	Dam would be re-built to safe dam standards. Public safety would be greatly improved. As long as dam exist in drainage, there is always a possibility of a dam failure. New engineered design would greatly reduce the threat. Annual dam inspections and dam inspections during and after storm events would also reduce threat.	Removal of dam would eliminated public hazard and threat to habitat, stream corridor and Kennedy Drive and associated bridges. No mitigation necessary. Trail extension in Alternative C would make visitors take less risk in visiting falls at both Brandy and Boulder Creeks.
Threatened and Endangered Species	No mitigation necessary since there are no known T&E species in the project site.	No mitigation necessary since there are no known T&E species in the project site.	No mitigation necessary since there are no known T&E species in the project site.
Wildlife	Exotic animals would be removed and euthenized as is policy of National Park Service and Whiskeytown NRA. Native species would benefit and improved habitat quality would be provided. Visitors would have a more natural experience. No impact to natives in this alternative.	Exotic animals would be removed and euthenized as is policy of National Park Service and Whiskeytown NRA. Native species would benefit and improved habitat quality would be provided. Visitors would have a more natural experience. Moderate disruption during re-construction period. No expansion of habitat allowed. Native pond turtles would have reduced predation until bullfrogs re-colonize. National Park Service would try to control exotic reintroduction.	Exotic animals would be removed and euthenized as is policy of National Park Service and Whiskeytown NRA. Native species would benefit and improved habitat quality would be provided. Visitors would have a more natural experience per National Park Service policy and park GMP. Native animals that utilize riparian habitat would have expanded habitat to move into. Native western pond turtles would be re-located into Brandy Creek pools or Whiskeytown Lake.

Table 4. Summary of Mitigation *(continued)*

Vegetation	Exotic plants would be removed per National Park Service Policy. Artificial wetlands habitat would continue to be sustained at the pond. Native riparian vegetation would not be able to reclaim site as long as pond remains.	Exotic plants would be removed per National Park Service Policy. Artificial wetlands habitat would continue to be sustained at the pond. Native riparian vegetation would not be able to reclaim site as long as pond remains	Exotic plants would be removed per National Park Service Policy. Artificial wetlands habitat would be removed and replaced with riparian habitat along intermittent stream corridor. Native pines and tree species could re-colonize pond area.
Wetlands/ Geomorphology	No impact to existing conditions.	Reservoir would be excavated and fill material that is filling in the pond would be removed. Removed material would be used to restore old access and logging roads around the pond and dam site.	Reservoir would be excavated and fill material that is filling in the pond would be removed. Removed material would be used to restore old access and logging roads around the pond and dam site. Natural stream corridor is restored. Man caused deltas are removed (delta areas 1 &2) Brandy Creek trail extensions would be developed in mixed conifer forest to upper waterfall. Boulder Creek trail extension will enter riparian area and be constructed along right bank for distance of 30 feet.
Cultural Resources	No known cultural resources- No known impacts or mitigation necessary.	No known cultural resources- No known impacts or mitigation necessary. Dam site received an archeological site visit.	No known cultural resources- No known impacts or mitigation necessary. Cultural resource inspections will be completed prior to ground disturbing activities at waterfall trail extensions.
Operations	Continued annual inspection and maintenance work likely necessary following large storm events. Potential catastrophic failure possible. Dam site rated 416 out of 1000 for hazard by BOR. Mitigation would include annual maintenance to dam structure and monitoring by park staff of dam, especially during storm events.	Continued annual inspection and maintenance work likely necessary following large storm events. Dam reconstruction would improve dam safety and lessen possibility of dam failure. Reconstruction would reduce threat to Kennedy Drive, bridges and picnic areas.	Eliminate annual dam inspections with removal of structure. Eliminate threat of a downstream significant hazard situation. Removal of dam mitigates threat to Kennedy Drive, Brandy Creek Bridge and picnic area.
Cumulative Impacts	No known change unless dam fails. If dam structure fails, substantial impacts to National Park Service operations and visitor safety. Kennedy Drive and road, bridges and picnic areas could be seriously damaged.	No known cumulative impact if dam is totally rebuilt with the exception that the facility will continue to cost the NPS annually for inspections and maintenance as needed. The reservoir pond will likely continue to serve as a breeding pool for exotic bullfrogs that will adversely impact native species of amphibians and reptiles.	No known cumulative impact. Positive watershed restoration benefits will be implemented with dam removal. Exotic animal issue will cease to be a an issue with the removal of the dam. Trail extensions to waterfalls will benefit recreational experience for visitors. Loss of reservoir for recreation including fishing, swimming and sunbathing will be deferred to Brandy Creek pools in close proximity to the A-Frame dam location.

The summary table listed above illustrates that Alternative A and Alternative B will have no significant changes to the existing conditions. Alternative C would replace the pond's wetland habitat with intermittent riparian stream habitat and have a net gain of 7,300 square feet of riparian habitat. It is important to note that the pond's wetlands habitat in both Alternative A & B is different in many ways then the intermittent stream habitat gains of Alternative C. Alternative C is the only alternative that restore's the natural conditions back to what existed at the site prior to the A-Frame Dam being constructed in 1960.

Cost of operations, including annual maintenance and inspections, will continue in both Alternative A and Alternative B. These reoccurring cost will be eliminated with Alternative C, along with the hazard of a dam failure and subsequent potential debris flow.

E.1 Consultation and Coordination

This document was prepared by the staff of Whiskeytown National Recreation Area with advice and consultation from the BOR management. Staff listed below assisted in preparing or reviewing this document. A public scoping meeting was held on June 18, 2002, in Old Shasta, California, and public comments were accepted. Points of interest, concerns, and issues from this meeting were incorporated into this document.

Jim F. Milestone	Superintendent, WHIS
Steve Young	Engineer, BOR, Denver
Jerry Wheeler	Facility Manager, WHIS
Pual DePrey	Chief of Resources, WHIS
Teri Tucker	Environmental Compliance Specialist
Steve Thede	Chief of Interpretation, WHIS
Jennifer Gibson	Ecologist, WHIS
Russ Weatherbee	Wildlife Biologist, WHIS
Gretchen Ring	Botanist, WHIS
Wayne Pero	Maintenance Mechanic Foreman
Brian Rassmussen	Geologist, WHIS
Beth Doolittle Norby	California Regional Water Quality Control Board, Redding
Will Ness	U.S. Army Corps of Engineers
Jess Newton	U.S. Fish and Wildlife Service, Sacramento
Howard Brown	National Marine Fisheries Service
Mike Tucker	National Marine Fisheries Service

Copies of this document were sent to the U.S. Fish and Wildlife Service; U.S. Forest Service, Bureau of Land Management, Regional Water Quality Board, Shasta County; U.S. Army Corps of Engineers, Shasta County Library, and the State Historic

Preservation Office in Sacramento, California. Local residence who expressed an interest in this project were also sent copies of this document.

This document will be available to the public and comments will be accepted for 30 days. After receiving and evaluating public comments if the Superintendent finds that the proposed action will not significantly affect the quality of the human environment a Finding of No Significant Impact (FONSI) will be prepared and forwarded to the Pacific West Regional Director for his approval.

E.2 References

Gibson, Jennifer, National Park Service Ecologist. February 2002. Personal communications. National Park Service, Whiskeytown NRA, Whiskeytown, CA 96095

National Park Service's Maintenance, Operations, and Safety of Dams (MOSD) Program Public Law 104-303, Section 215, National Dam Safety Program Act of 1996; U.S. Department of the Interior Departmental Manual, Part 753, Dam Safety Program; and the National Park Service Management Policies, 1988.

Ring, Gretchen, National Park Service botanist, March 7, 2001. Personal communications. National Park Service, Whiskeytown NRA, Whiskeytown, CA 96095

Safety Evaluation of Existing Dams' (SEED Program) study in September 1997; Whiskeytown NRA, (National Park Service, Wayne N. Young, P.E.).

Veesaert, Chris J., Manager, BOR, Inspections and Emergency Management Group, (memo to Superintendent of Columbia Cascades Support Office, Pacific West Region, June 28, 1999). Reference inspection of Whiskeytown NRA A-Frame Dam.

Westlake, Jim, March 6, 2002, Personal communication and field trip to A-Frame Dam. Historic resident of Brandy Creek and original contractor and owner of the A-Frame Dam.

End Document